

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-19 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 1, on line 4, "said acoustic detector" and on line 5, "said sample chamber" lacks clear antecedent basis since there are plural detectors and chambers claimed prior and probably should read each of said acoustic detectors or each of said sample chambers. Further, on line 10, "said plurality of acoustic detectors" lacks clear antecedent basis, note lines 4 and 9, each claiming "a plurality of acoustic detectors". Also, claim 1 is inconsistent with Figure 7 in the multiplexer 82 positioning. In claim 2, on line 4, "said acoustic detector" lacks clear antecedent basis. In claim 3, on line 2, "said sample chamber" lacks clear antecedent basis. In claim 10, on line 4, "said acoustic detector" and on line 5, "said sample chamber" and on line 7, "said piezoelectric crystal" lacks clear antecedent basis. In claim 13, on line 3, "said acoustic detector" lacks clear antecedent basis. In claim 17, on line 2, "said acoustic detector" lacks clear antecedent basis. Further, in the claims it is unclear why a multiplexer device is even required if the

signal from the driving device is being fed "simultaneously" to the plurality of acoustic detectors.

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-19 and 21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Reference is made to multiplexing circuit 82 in figure 7 and appears to be located after the oscillator circuit 17 and not in between the detectors and the oscillator as found in the claims. Further, it appears that this multiplexer is also not a multiplexer but rather should be a demultiplexer since a single signal is being divided into multiple signals. In Figure 14, again there appears to be demultiplexing rather than multiplexing. . Further, in the claims it is unclear why a multiplexer device is even required if the signal from the driving device is being fed "simultaneously" to the plurality of acoustic detectors.

***Claim Rejections - 35 USC § 103***

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1, and 5-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over McFarland et al-US Patent # 6,182,499 in view of Potyrailo-US Pub # US Patent # 2002/0172620. As to claim 1, **as best understood**, McFarland et al disclose a system and method for characterization of materials with mechanical oscillators including plural sample chambers (arrayed wells 801/cells 901), controller (thermistor 807/909) for controlling the temperature of the wells/cells, a plurality of acoustic detectors (network analyzer 505 with quartz resonator probes 501/805/903 (piezoelectric quartz)), driving device and data device (data acquisition and controller board 907 with computer 915 and processor 913), see figs. 8 and 9 and col. 12, lines 64 et seq. Also, it is noted that Fig. 9 depicts a multiplexed control circuit where the resonators 903 are in **parallel** and are fed a simultaneous "resonator stimulus signal". However, McFarland et al lack a teaching for a multiplexer connected between said driving device and acoustic detectors. In a closely related prior art device, Potyrailo discloses a system and method for rapid evaluation of chemical resistance of materials in which there is included an array of acoustic devices 31/32 where it is also indicated that a single oscillation source may be utilized in combination with a multiplexer to sequentially initiate oscillation for each of a plurality of acoustic wave devices in the array, see par [47]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have included the

usage of a multiplexer with a single oscillation source to resonate each of or groups of resonators in the McFarland et al device in order to reduce the number of oscillation sources required. As to claim 5, note multiplexers (mux) in multiplexer control circuit along with data acquisition and controller board 907 with computer 915 and processor 913 with data processing and storage in fig. 9. As to claim 6, the driving device is an oscillator, note fig. 5 description with frequency sweep system. As to claim 7, note the multiplexed control circuit of fig. 9 includes a computer 915 with processor 913 which is programmable and further the multiplexer suggested by Potyrailo could also be easily programmable since such an expediency is old and well-known for automatic control. As to claim 8, note that the computer 915 which processor 913 could be designated the data validator as they are capable of such. As to claim 9, McFarland et al employ a frequency sweep system for function generator in the network analyzer and do not specify a Fourier transform generator. However, usage of a Fourier transform generator is known for generating complex and continuous waveforms as required by McFarland et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have included a Fourier transform function generator in the McFarland et al device since such an expediency is known for generating complex and continuous waveforms. As to claim 10, **as best understood**, McFarland et al disclose a method for characterization of materials with mechanical oscillators including providing plural

sample chambers (arrayed wells 801/cells 901), providing a plurality of acoustic detectors (quartz resonators 805/903), driving the detectors with data acquisition and controller board 907 with computer 915 and processor 913 at a resonant frequency and measuring a output of the resonators, see figs. 8 and 9 and col. 12, lines 64 et seq. Further, McFarland et al teach simultaneously sending a resonator stimulus signal to parallel resonators (see fig. 9) but lack a teaching for provision of oscillation using a multiplexed output from an oscillator circuit. However, as indicated above with regard to claim 1, Potyrailo discloses a system and method for rapid evaluation of chemical resistance of materials in which there is included an array of acoustic devices 31/32 where it is also indicated that a single oscillation source may be utilized in combination with a multiplexer to sequentially initiate oscillation for each of a plurality of acoustic wave devices in the array, see par [47]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have included the usage of a multiplexer with a single oscillation source to resonate either each or groups of the resonators in the McFarland et al device in order to reduce the number of oscillation sources required. As to claim 11, McFarland et al lack a teaching for provision of 96 wells. However, McFarland et al indicate that "a large array of cells" can be included in the circuit of fig. 9. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have included any number of reasonable wells such as 96 wells since McFarland et al

teach inclusion of a large number of wells and since sample trays of 96 wells are old and well-known. As to claim 12, note in fig. 9 that board 907 is coupled to computer 915 and processor 913 for programming exchange and control.

7. Claims 2-4, 13-19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over McFarland et al in view of Potyrailo as applied to claims 1, 5-12 and 20 above, and further in view of Long et al-US Patent # 5,041,800. As to claim 2, McFarland disclose that the thermistor controls the temperature. However, McFarland lack a teaching for the thermistor 807 to be in contact with a surface of the detector. In a related prior art device, Long et al disclose a low power oscillator with a heated resonator including resonator 114 with an enclosure 104 and a further temperature sensor (thermistor 112) on a surface of enclosure 104 so as to control the temperature of the enclosure, see fig. 1A. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used a thermistor on the surface of the enclosure in McFarland et al's device in order to be able to maintain the temperature of the resonator at or near its desired temperature, see Abstract of Long et al. As to claims 3 and 21, note that Long et al include a crystal resonator enclosure 104 along with the heating element 102 obviously to maintain the temperature control more efficiently. As to claim 4, note the global thermostat control signal coming from the controller board 907 which is in communication with programmable computer 915 in fig. 9. As to claim 13, note thermistors 909 are recited as

controlled via board 907 and GT control signal. However, McFarland lack a teaching for the thermistor to be in contact with a surface of the detector. In a related prior art device, Long et al disclose a low power oscillator with a heated resonator including resonator 114 and a further thermistor 112 so as to control the temperature of the resonator, see fig. 1A. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used a thermistor on the surface of the detector enclosure in McFarland et al's device in order to be able to maintain the temperature of the resonator at or near its desired temperature, see Abstract of Long et al. As to claim 14, note the "predefined temperature" indicated in col. 13, lines 19-30 indicating a temperature control. As to claim 15, note lines 45-50 of col. 13. As to claims 16 and 17, note the resonant frequency response over time is measured, note abstract. As to claim 18, note the properties measured as in the Abstract. As to claim 19, note col. 13, lines 31-50.

### ***Response to Arguments***

8. Applicant's arguments filed 10/2/09 have been fully considered but they are not persuasive. Applicant has argued that that McFarland et al does not employ a multiplexer to multiplex the signals to drive the sensors and Potyrailo sequentially oscillates rather than simultaneously. Such arguments are not found persuasive because if the detectors are being driven simultaneously then a multiplexer is not required as in the McFarland et al device who sends a stimulus

signal to parallel resonators and if **one or groups** are being actuated sequentially, then Potyrailo provides the teaching for employing a multiplexer so that a single oscillator source may be used to control the driving, depending upon the detectors requiring stimulation.

### ***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nashmiya S. Fayyaz whose telephone number is 571-272-2192. The examiner can normally be reached on Tuesdays and Thursdays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron E. Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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/N. S. F./

Examiner, Art Unit 2856

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